

TILAK MAHARASHTRA VIDYAPEETH, PUNE
MASTER OF COMPUTER APPLICATIONS
(Specialization in Artificial Intelligence & Machine Learning)/
(Specialization In Data Science)
EXAMINATION : JANUARY-2025
SEMESTER - III

Sub: Time Series Analysis / Principles of Time Series Analysis
(MCAI 23-307/ MCDS23-304)

Date :10/01/2025

Total Marks :60

Time:10.00 am to 12.30 pm

Instruction:

1. All questions are compulsory unless and otherwise stated.
2. Bold figures to the right of every question are the maximum marks for that question.
3. Candidates are advised to attempt questions in order.
4. Answers written illegibly are likely to be marked zero.
5. Use of scientific calculators, Log tables, Mollier Charts is allowed.
6. Draw neat and labelled diagram wherever necessary.

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- Q.1. Answer the following in 2-3lines. (Any 5) (10)**
1. What is Stationarity in time series analysis?
 2. State four (04) applications areas of Time Series Analysis.
 3. Define the term white noise process.
 4. List two examples of stationary models.
 5. What is the Akaike Information Criterion (AIC) used for in ARIMA modeling?
 6. What is a "unit root" in time series?
 7. Define "random walk."
- Q. 2. Answer the following in short. (Any 4) (20)**
1. How is ARIMA different from ARMA? Discuss.
 2. Describe the steps involved in decomposing a time series.
 3. Explain the concept of a Vector Autoregressive (VAR) model and its basic structure.
 4. Mention one key difference between Univariate and Multivariate time series analysis.
 5. In ARIMA(p,d,q) model, what are these parameters p,d and q. How they are determined?
 6. Given the Time Series Dataset 'stock_prices.csv'. Write and explain commands which is used to open this dataset in Python.
- Q. 3. Answer the following in detail. (Any 3) (30)**
1. Discuss the components of time series analysis with real-world examples. Describe conditions which are required to be met, before beginning of analysis of given time series.
 2. What is Spectral Density?. Explain the significance of Spectral Density in time series.
 3. What is the purpose of the Augmented Dickey-Fuller test (ADFT), how does ADFT differ from DFR? Explain in detail.
 4. Compare and contrast the VAR model and the Vector Error Correction Model (VECM), stating their applications in multivariate time series analysis.
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